Patented Sept. 6, 1938

2,129,305

UNITED STATES PATENT OFFICE

2,129,305

CONTACT LENS

William Feinbloom, New York, N. Y.

Application August 21, 1936, Serial No. 97,092

2 Claims. (Cl. 88—54)

The present invention relates to contact lenses.

In my copending application, Serial No. 87,577, filed June 26, 1936, there is described a method of making a contact lens from a mold of the eyeball.

In practice, the inner surface of the finished contact lens is made to differ from the surface of the mold taken from the eye in order that the finished lens should fit the eye comfortably. This difference between the two surfaces is called "tolerance" and may vary somewhat from patient to patient. The difference will depend on the various forces that operate while the eye is in motion, and the requirement that there be a fairly free flow of tears and oil under the lens.

When a contact lens made with suitable "tolerance" is placed in the eye, it will contact the eye, through the saline solution therebetween, over a certain surface area. As the lens is continuously worn over a number of hours, the eyelid tends to force the surface closer and closer into the conjunctiva of the eye. This means that the forces of friction, which exist between the two surfaces when the lens is first worn, have now been increased and produce discomfort.

The movement of the eyelids, it has also been found, generates two torques; namely, one operating around a vertical axis which tends to move the lens toward the nose, and another operating around a horizontal axis which tends to rotate the lens upward. When the eye moves about, the action of these torques is to cause the lens to slide on the eye. This sliding is of the order of a half to one millimeter and is a cause of further discomfort to the wearer.

One of the objects of the present invention is to improve the comfort of the finished contact lens.

Another object of the invention is to reduce the area of friction of the surface of the lens during sliding to substantially a minimum.

A further object is to enable the securing of greater or less "tolerance" between the inner surface of the lens and the eyeball.

A still further object is to provide a method of readily determining the "tolerance" required because of the various forces acting on the lens when placed in the eye.

Various features of the invention lie in the use of beads on the outer surface of the scleral portion of the contact lens, lenses having pinhole openings in the corneal section of the lens, filtered contact lenses for excluding one or more kinds of light rays, lenses with suitable holes in the scleral rim for reducing suction on the lens, and bifocal, trifocal and multifocal contact lenses.

Several of the foregoing objects are, in general, achieved, in accordance with the invention, through the use of a "bead" formed on the surface of the lens. By means of this bead and/or other "beads" suitably located, it is possible to have friction during sliding of the lens occur only at these "beads". This results in less of the conjunctiva of the eye being hit or bruised than if there were no "bead"; first because less of the surface area of the lens is in contact with the eye, and secondly, because friction over a rounded surface like the "bead" may be compared, in its action, to "rolling" friction rather than "sliding" friction.

Other objects, features and advantages of the invention will appear from a reading of the following detailed description which is accompanied by drawings, wherein:

Fig. 1 illustrates, in cross section, one embodiment of a contact lens in accordance with the invention as it would appear over an eyeball.

Figs. 2 to 9 illustrate other views of contact lenses made in accordance with the principles of the invention. These figures are the bottom views of the contact lenses. Figs. 2, 3, and 7 illustrate beads on the contour of the lenses, which are not of uniform shape. Figs. 4, 5, and 6 illustrate beads in the form of thin raised surfaces on the scleral portion of the lens. Figs. 7, 8, and 9 illustrate contact lenses wherein the corneal portion is a multi-focal lens.

Figs. 10 and 11 are given for theoretical considerations and will be discussed later in connection with certain mathematical relations which